The role of expertise in governance processes

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1. Introduction

In this paper I want to examine two prominent cases of global governance in the light of recent developments in Science and Technology Studies (STS). Specifically reflecting on the role of expertise in decision making processes in the cases of ozone layer protection and climate change, I will try to develop some lessons that could be applied to other cases such as international forestry. All three cases have in common that they are posing the problem of international cooperation in the face of uncertainty. National interests and national sovereignty are as important as knowledge claims about a global common good (or common pool resources, cf. Ostrom, 1990.While the cases of ozone politics and climate change have been studied extensively by social scientists and led to several international treaties, forests have received little attention in comparison. It seems appropriate to relate some of the findings from the literature on global atmospheric commons to the case of forestry. I will do this by introducing influential models of conceiving knowledge and expertise in the process of political decision making (Section 2), then presenting the cases of ozone layer protection (Section 3) and climate change (Section 4). In section 5 I will draw some conclusions and then address the issue of forestry (Section 6).

2. Knowledge and politics

Modern societies are increasingly dependent on knowledge. They are characterized by the development and dissemination of knowledge, by a multitude of knowledge sources and high levels of scientific literacy. The term Knowledge Society has been coined to describe them (Stehr, 1994). However, the term knowledge society does not necessarily imply that society in general (and politics in particular) is now, in contrast to previous eras, informed by more and better knowledge and therefore more 'rational' (Beck, 1992). Such an assumption would presuppose (1) that knowledge is unambiguous, (2) that it can be applied in a more or less direct way and (3) that its results are useful or desirable for society. This is the traditional view known as the linear model of knowledge production and application. According to this view, knowledge is first generated as basic research and removed from considerations of application. This leads to a 'true' description of reality. Then it becomes applied knowledge, knowledge specified to solve specific problems. Finally it is put into practice through engineering devices or decision making in politics and business (Bush, 1945). There are various versions of this model, some describe it in terms of diffusion or trickling down, others in terms of translation and transfer.

The linear model has an inbuilt assumption that decision making is rational. In essence, it is assumed that decision makers will alter their practices on the basis of new information. Or at least, it is assumed that decision making should be rational, i.e. the 'barriers' to this mechanism should be removed. Examples of such barriers are manifold, including ignorance of practitioners, vested interests, unavailability of data, or ideological factors.

The linear model also assumes that knowledge will have real effects, that it is instrumental. Knowledge is a reflection of reality and embodies causal relations that will hold true in new applications. This assumption is based on the belief that the conditions of application will be neutral to the supposed functioning of knowledge.

In the past three decades much work in the field of Science and Technology Studies (STS) has been published showing that science is not separate from society and that it does not discover uncontested 'truths' that are then translated into technologies or policies. Rather, we have to assume a co-production of scientific claims, political decisions and social order (Jasanoff and Wynne, 1998; Jasanoff, 2004).

Such observations challenge the imagery of science as being separate from and neutral to societal interests. Researchers have proposed new ways of conceptualising the relation between science and society. One major concern in recent years has been the role of lay participation in science based policy decisions (Funtowicz and Ravetz, 1993; Gibbons et al., 1994; Jasanoff, 1990; Irwin, 1995; Liberatore and Funtowicz, 2003; Nowotny et al., 2001; Lengwiler, 2008). One can also see a civic engagement of scientific experts in such debates. In increasing numbers scientists are leaving their laboratories and lecture halls in order to take part in political debates about the future of science and the social consequences of scientific developments. Some scientists represent a body of knowledge that is highly policy relevant, and at the same time is informed by normative beliefs and values. They have been defined as 'popularizers or advocates who bridge environmentalism and science' (Hannigan,1995). Advocacy scientists' claims are likely to be taken up if media attention goes up, and if the issue can be dramatized by symbolic and visual means (Ungar, 1992).

The above has several implications for decision making and governance. According to the linear model, it would seem that 'getting the science right' is precondition for good policies. Sound science will help to put an end to ongoing political and ideological debates. Reducing scientific uncertainty leads to political consensus and 'good policy decisions'.

According to STS studies, facts and values are intertwined and uncertainty is a constitutive feature of knowledge, as is the fragility of the societal contexts within which such knowledge must operate. There is no such thing as scientific knowledge removed from society and politics. Knowledge production always occurs in political and ideological contexts. However, it must never present itself as such. In order to be legitimate knowledge, it has to be purified of such mundane links. Latour (1993) uses the conceptual pair of hybridisation and purification to describe this process. Purification means a clear separation of nature from society, while hybridization involves mixtures of nature and culture. Latour claims that it is a modern belief that the human and non-human worlds can be separated and exist independent from each other, each in a pure form. Applied to knowledge production this means that facts (about nature) and values (about we ought to do) are seen as separate in the modern world view but bound up with each other in reality.

One might suspect that the more knowledge is produced in hybrid arrangements, the more the protagonists will insist on the integrity, even veracity of their findings.

Stressing the role of interpretation and judgement in the work of scientific advisors, Jasanoff (1990: 229) observed that 'experts themselves seem at times painfully aware that what they are doing is not 'science' in any ordinary sense, but a hybrid activity that combines elements of scientific evidence and reasoning with large doses of social and political judgment.' This is meant to apply to scientists in their role as policy advisors. If we apply it to advocacy scientists we see that a specific course of action is advocated, typically with urgency and in public fora. Usually advocates are motivated by genuine concerns about the future of society and the environment. They also share the view contained in the linear model that science dictates policy.

As a result of the growing importance of scientific expertise for decision making several problems have been identified (e.g. Haas, 2004; Oreskes et al., 1994; Pielke, 2007):

- Scientific consensus is often suspect because the scientists themselves are part of a broader cultural discourse, and thus lack autonomy or independent stature;
- Science has become extremely politicized. The use of science is mediated and thus possibly distorted by the political goals of potential users;
- Science may not be sufficiently simple for the needs of policymakers;
- Science may provide advice that is out of synch with the political plans of decision-makers or parliaments, and thus be dismissed;
- There is an over-reliance on models based on the assumption that models would mimic reality;
- There is an over-selling of scientific results based on the assumption that science could speak truth to power.

Roger Pielke Jr. (2007) has argued that in order to improve policy decision making processes one should pay closer attention to the potential of 'honest brokers' who—unlike advocates—would increase the number of options for policy makers. My suspicion is that neither the advocate nor the honest broker can escape the tension of hybridization and purification. In what follows I will demonstrate that the case of ozone depletion was characterized by a constellation of industry lobby vs. advocates whereas the case of global climate change is characterized by an institutionalized assessment structure. In both cases the processes of hybridization and purification have been evident, albeit in different ways.

3. Ozone layer protection

In June 1974, two chemists of the University of California at Irvine published an article in Nature, in which they put forward the hypothesis that CFCs could damage the ozone layer. This so-called Molina–Rowland-Hypothesis called for a revision of the long believed harmlessness of CFCs which were very popular both with producers and consumers of many domestic and industrial appliances, since they seemed to be chemically inert, non-toxic and non corrosive. According to the Molina–Rowland-Hypothesis, CFCs could deplete stratospheric ozone and hence lead to an increase in UV-B radiation which in turn would have severe effects on biological systems (skin cancer in humans, crop damage, algae diminution) and on global climate.
From the beginning, there was controversy between the proponents of this hypothesis and industry. The proponents were supported by other scientists, environmentalists and policy-makers. They believed that although little was known, it was enough to warrant controls. Following the wait-and-see principle, those against CFC controls demanded more time for scientific research before addressing the question of controls. Needless to say that vested interests were backing this position, but also some scientists and decision-makers.
On June 30, 1975, the Du Pont Company ran a full-page ad in the New York Times and declared: 'Should reputable evidence show that some fluorocarbons cause a health hazard through depletion of the ozone layer, we are prepared to stop production of the offending compounds.' In the following years, Du Pont took great pains to make this point, namely that reputable evidence was not available. In the same ad the company spelled out the programme for the coming decade: 'Claim meets counterclaim. Assumptions are challenged on both sides. And nothing is settled.' A fight for scientific authority and credibility (in Latour's terminology: 'public trials of strength') ensued which put industry on the defensive.
DuPont's statement gave scientific research an important role in the whole process. After the discovery of abnormally low ozone levels over Antarctica (later known as 'the ozone hole') in 1985, more and more actors (including scientists) were convinced that something had to be done quickly—even in the absence of scientific proof. DuPont's statement also had a self-

binding effect: in 1986 the company signalled that it would no longer oppose international controls. However, it has to be born in mind that the reputable evidence was the observed damage of the ozone hole (and its potential catastrophic consequences) that convinced DuPont (Grundmann, 2001; Rowland, 2001).

3.1. Involvement and objectivity of scientists

An early opponent of CFC regulations, James Lovelock, acknowledges the role played by advocate scientists, especially by Rowland: 'If Rowland hadn't been so missionary about this it would never have developed to this point. If it would have been treated objectively, scientifically, as I would have liked to have seen it done, it probably would never have been treated as a serious issue by the public and by politicians. If he hadn't stirred up the Greens and the politicians. He must have spent an enormous amount of his time and effort going around lecturing, talking. He really barnstormed. He went to every little town and every little community, delivering his speech. I thought this isn't the way to do science, but I think he was probably right, because he believed in it' (Author interview with James Lovelock, 30 May 1995).

A problem arises for the scientific advocates: they are accused of betraying the ideals of science. Their public role entails 'popularising' scientific findings, taking sides in a political controversy and making policy recommendations. However, none of the scientists active in this field of research could avoid asking (or being asked) questions such as: Who has the burden of proof? What is a reasonable evidence of damage? Who should make judgements on these issues? How should one weigh 'worst case' scenarios? What weight should be given to social or economic benefits when considering regulation? (Brooks, 1982). Those were also the questions which had to be answered when political options were formulated—scientists and politicians alike had to find responses.

The scientists who were involved in the CFC controversy 'found themselves unable to avoid making explicit or implicit judgements about almost every one of these essentially non-scientific value questions, no matter how much they tried to 'stick to the facts'' (Brooks, 1982: 206). At hearings before a Congress subcommittee Rowland gave priority to ecological concerns when asked to rank them with economic interests: 'I think that the economic dislocation need to be given minimal weight compared to the maximum weight to the possible harm to the environment' (cited after Grundmann, 2001, p.73).

The advocacy scientists succeeded in presenting the case in a convincing way in public discussions, with school classes, during parliamentary hearings, and in media broadcasts. They also put forward a kind of 'political strategy' for the protection of the ozone layer. In the 1970s it was the proposal to replace CFC in spray cans which led to a growing concern about these substances in the United States, on the part of both consumers and lawmakers. This would be followed by a call for a ban on all CFCs after 1985.

In view of the uncertainties in the model calculations, there was indeed no purely scientific method to decide whether CFCs should be regulated, and if so, how strictly. Here each side had its own reading. Industry followed the slogan 'innocent until proven guilty', while the critics deduced the need for extraordinary precautionary measures. The question was whether the uncertainties of the computer models represented an argument for or against regulation. An error factor of two in the models meant that the problem could be either half as big or, just as easily, twice as big, as the atmospheric scientist Ralph Cicerone stressed at the Congress Hearings. Uncertainty cuts both ways.

The Clean Air Act of 1977 institutionalized a precautionary approach by banning CFCs in 'non-essential applications' (e.g. spray cans). Of central importance was the proviso that 'no conclusive proof … but a reasonable expectation' was sufficient to justify taking action.

Thismove was going to define US policy for the international negotiations (Betsill and Pielke, 1998).
A second aspect needs emphasizing here. The 'spray can ban' was enacted on the basis of a scientific hypothesis and model calculations about future ozone loss. No actual data on atmospheric change had been available at the time. Industry relentlessly pointed out that it was fundamentally opposed to the idea to regulate an industrial product on the basis of 'pure theory'.

3.2. Global initiatives

At the beginning of the 1980s, ozone depletion entered the agenda of international environmental policy making. Until 1986, the opponents of regulations repeated their position that too little was known to justify regulations. More scientific research was deemed necessary to remedy this lack of understanding. They were right in stating that little was known about the atmosphere. This became clear when the Antarctic ozone hole was discovered since no theoretical model had predicted this phenomenon. It took more than two years until it could be explained scientifically. But is (relative) ignorance or scientific uncertainty an excuse for inaction? This was the real question underlying all controversies over whether regulations were justified or not.
It is telling that many scientists active in the field of ozone depletion held a view about precautionary policies like the following: 'I always thought that in the face of uncertainty one could take a prudent course of action just as a form of insurance, just like you are buying a fire insurance, you are not predicting that you'll have a fire, but if there is a possibility for fire you can take out an insurance' (Author interview with US scientist, November 1995; note that this scientist was not acting as an advocate, on the contrary, he was for some time arguing against theories of anthropogenic causes of the ozone hole).
The discovery of the ozone hole was an alarm signal which changed the perception of the problem completely. As Rowland put it, 'The big loss of ozone over Antarctica has changed this from being a computer hypothesis plausible for the future to a current reality and cause for concern' (New York Times, 7 December 1986). Although it was officially not a topic in Montreal, it did in fact have an influence on the negotiations (Grundmann, 2001; Rowland, 2001). Media attention rose sharply after the ozone hole had been represented as a scientific fact (Grundmann, 2005).
The coloured picture of the ozone hole has become an icon to symbolize global environmental disasters. Before the metaphor 'ozone hole' came up, experts and lay persons from the mid-1970s to the mid-1980s were concerned with a possible future 'thinning of the ozone layer'. The difference between the two metaphors is evident. While the thinning metaphor evokes the picture of a tissue that is threadbare, the whole metaphor evokes the picture of a balloon which is punctured and blows up or loses its air; or an organism that got an infectious disease. This metaphor clearly was designed to capture the element of drama. Before 1985, everyone expected an ozone loss of maybe 10 or 20% in one hundred years (Benedick, 1991, p.13).
In sum, advocate scientists who were able and willing to alert the public were crucial for the dynamic to develop. They received support from prestigious science institutions and credible media outlets. This put the pressure on politicians and businesses to change their course of action. Key to their success was the credibility they had gained during the controversy. As the unexpected ozone hole appeared, they were in a position to bolster their pro-regulation position most convincingly.

4. Climate change

We would not worry about changes in the climate system if there had not been concerned scientists from the climate science community going public. Likewise, the search for solutions to the problem of climate change gives them the role of an actor in the public arena. Climate change is ‘one of the most sophisticated and heated science policy controversies in recent history’ (O'Donnell, 2000). This is due to the fact that stakes are high, the stakeholders are numerous and the expert knowledge is contested (cf. Funtowicz and Ravetz, 1993).

Public concern about climate change reached a first peak in the mid 1980s. In August 1986 the German weekly Der Spiegel featured Cologne cathedral on its cover page, submerged by water, adorned with the headline ‘Climatic catastrophe’ (Weingart et al., 2000). In June 1988 NASA scientist James Hansen during a testimonial statement to US Congress stated he was ‘99%’ certain that global warming was real has been detected, and it is changing our climate now’, and even more (O'Donnell, 2000). He said that ‘in my opinion the greenhouse effect pronounced, when he told a New York Times reporter ‘It is time to stop waffling so much and say that the evidence is pretty strong that the greenhouse effect is here’ (New York Times 24 June A1, 1988).

Hansen was not known for any partisanship on part of environmentalist pressure groups. If anything, he had been perceived as cautious on the issue and rather in favour of a wait-and-see approach. Apart from these personal circumstances which lent his statements special weight, the fact that he spoke during a major drought was very effective. The timing of his appearance before the Congress committee was no coincidence but carefully staged. US Senator Tim Wirth had organized the hearings on global warming (see Andresen and Agrawala, 2002:44). This context was ideal to dramatise the issue, especially when he said that ‘in my opinion the greenhouse effect has been detected, and it is changing our climate now’, and even more pronounced, when he told a New York Times reporter ‘It is time to stop waffling so much and say that the evidence is pretty strong that the greenhouse effect is here’ (NYT 24 June A1, 1988).

Hansen was soon to be attacked by sceptical ‘contrarians’ who described the whole issue as ‘global warming scare’. Patrick Michaels, a professor of environmental sciences at the University of Virginia, and senior fellow at the conservative Cato Institute, Washington DC, attacked him as being the only scientist to claim that there was a cause–effect relationship between ‘current temperatures and human alterations of the atmosphere’ (Science,12May 1989; see also Hansen and Michaels, 2000).

This attack exemplifies what is at stake for individual scientists who act as advocates—they want to appear as objective or scientific as possible, and to avoid the impression of being driven by political or other motives. Hence Michaels' insinuation that Hansen does not fit within the mainstream of scientific opinion as being ‘the only scientist’ to claim a relationship between current weather and long-term trends. This allusion gets a special meaning given similar efforts by the IPCC to brandish contrarians like Michaels as ‘only a handful’ of dissenting individuals. There are statements from the IPCC to this effect and Hansen himself countered Michael's claim by saying that ‘the scientific community is convinced that we are headed for substantial climate changes in coming decades if greenhouse gas emissions continue to grow, as discussed by several reports by the National Academy of Sciences and by prestigious international organizations’ (Washington Post, 11 February 1989, A 23).

4.1. Global governance and science

The role of the Intergovernmental Panel on Climate Change (IPCC) is to review and assess the published scientific literature on climate change, its costs, impacts, and possible policy responses. It also plays a role in assessing scientific and technical issues for the UN Framework Convention on Climate Change. Set up by the United Nations in November 1988, the IPCC was supposed to assess the state of knowledge and to ensure that global governance is made easier by representing important stakeholders in the assessment process. The first chairman of the IPCC, Bert Bolin, explained that the IPCC was designed in order to boost trust in the science among nations: 'Right now, many countries, especially developing countries, simply do not trust assessments in which their scientists and policymakers have not participated. Don't you think credibility demands global representation?' (cit. after Schneider, 1991, p. 25). This conviction was one of the initial ideas for the intergovernmental organisational set-up of the IPCC and the governmental approval mechanism (Siebenhüner, 2003; Skodvin, 2000).

The architects of the IPCC attempt to reach a consensus view on the scientific aspects of global climate change as this is seen as necessary for obtaining policy decisions that are based on best available knowledge. In fact it was one of the lessons drawn from the experience of the ozone case that scientific assessments should be unified in a single authoritative report. This would stop the proliferation of many (potentially contradictory) assessments, including advocacy on both sides of the political spectrum. Technocracy was to cure the ills of politicised science debates.

With the growing role played by the IPCC a dynamic has set which complicates the simple antagonism so apparent in the ozone case. Hybridization and purification work in a slightly different manner. The IPCC takes great pain to demonstrate that its assessments are based on the best available science. It aspires to a role Roger Pielke Jr. has labeled 'honest broker'. How well the IPCC fulfils this role is debated (and Pielke doubts that the IPCC does fulfil this role). Some sceptics argue that IPCC science is 'junk', others criticize its over-reliance on models (Oreskes et al., 1994), and overselling the state of knowledge (Pielke Jr, 2007). Such critics claim that despite advances in climate science we still face big uncertainties which are systematically downplayed by the IPCC and that instead a consensus is 'orchestrated' (Elzinga, 1995; Oppenheimer et al., 2007).

It has also been argued that the IPCC used simple messages in order not to confuse policy makers. An example is climate sensitivity which for some time was estimated at a range of 1.5–4.5 °C as result of doubling CO2 concentrations in the atmosphere. Some have argued that this 'anchoring device' was not altered despite the fact that scientists themselves were not too confident about this range but they stuck with it in order not to give the impression that their findings were uncertain (Van der Sluijs et al., 1998).

Like in the case of ozone depletion there is a widespread perception that science is the final arbiter in the climate change debate and that science will ultimately prescribe policy. Any criticisms levelled at the work of the IPCC are seen as attempts of undermining the political project of curbing GHG emissions. During the so called Lomborg controversy several eminent scientists attacked Lomborg for his 'bad science' with strong overtones suggesting hewas the target because of a fear of political diversion (see Lomborg, 2001 and the discussions in Environmental Science & Policy, Special issue on Lomborg, 2004 and in Scientific American, 2002 Vol. 286, Issue 1). This is a direct outcome of the linear view held by these scientists (a view Lomborg hares with his opponents) which culminates in the belief that if there remains scientific uncertainty, carbon emission reductions are seen as not legitimate.

No other than Al Gore summarized this view when saying that 'more research and better research and better targeted research is absolutely essential if we are going to eliminate the remaining areas of uncertainty and build the broader and stronger political consensus necessary for the unprecedented actions required to address this problem' (cited in Sarewitz and Pielke, 2000).

Such a belief has two dysfunctional side effects. For one, it tends to marginalise other viewpoints which do not belong to the scientific mainstream represented in the IPCC process or deviating in other ways. Stifling scientific debate, it goes without saying, is problematic in itself. Secondly, it obscures the important lesson from the ozone case, i.e. that there is no need for scientific proof in order to be prudent. If decision makers and the public agree that it is 'Better safe than sorry' and that it is prudent to 'take out insurance' even if there is a low likelihood of damage occurring then one would not need place such exaggerated hopes on science.

5. Lessons

What lessons can be drawn? In both cases scientists have shaped the framework of public debate, either by acting in an advocacy manner or by institutionalising an assessment process closely linked to political decision making. There are problems with both roles. It is plain that advocates are vulnerable in many ways and have to take great pains to maintain their scientific credibility. Institutions like the IPCC on the other hand are not free from this problem either as they may be perceived as biased or advocates in disguise. What is more, they seem to be remarkably ineffective as regards political outcomes. Climate science and policy are still a matter for domestic policy disputes despite the fact that the IPCC is an intergovernmental body. As experience has shown, not all governments have taken on board the IPCC message (see Grundmann, 2007). And what is more, all the evidence amassed by the STS community notwithstanding, the linear model still has a powerful grip on participants in such knowledge based decision processes. This might be surprising given the relative failure of climate change policy so far. The reduction targets are not substantial enough in terms of mitigation, the problem of adaptation is not addressed and, perhaps most important of all, some major polluting countries have not ratified the protocol.

The linear model could be described as 'natural ideology' of knowledge societies. In the case of climate change, those in favour of strict regulations would argue that the IPCC was politically effective in that it has led to ambitious goals of the EU (despite problems with the Kyoto Protocol) and that 'rational policymaking' prevailed: the best scientific knowledge is being been put into practice. The sceptics on the other hand could maintain that they have influenced US policy in abstaining from a costly and unfair climate treaty based on limited scientific understanding. Politicians (no matter if European or US) support such a reading, as science lends legitimation for political decisions. They would be loath to take sole responsibility for big decisions which are contested and contestable. Here it always best to 'shift responsibility' to someone else, in this case to expert communities. In sum, scientists and politicians alike converge on an interpretation that portrays science as the final arbiter of contested policy issues. Even NGOs participate in this 'scientification' of debates by appointing top officers with science degrees and scientific legitimation to their ranks.

Arguably, advocacy was more effective in the ozone case. This does not mean that the same model can be applied to other cases. As the climate change debate has shown from the very beginning, path-dependency and policy learning may well mean that several actors are keen to 'fight the last war' based on the lessons drawn. One lesson for the opponents of precautionary action was to insist on scientific proof to legitimize carbon controls, thus reversing the US Clean Air Act regulation of 1977 for CFCs. It is open to speculation that supporters of a precautionary US climate policy may have worked under the assumption that a real crisis (the occurrence of the ozone hole) would be politically most effective. As a consequence, scientific statements may have been over dramatised, a fact that would be exposed immediately by the sceptics. There are various examples of linking dramatic developments to climate change (West Antarctic Ice Shields, Thermohaline circulation, intensity of hurricanes, etc.).

6. And forestry?

Forestry, like climate change and ozone layer protection is an example where environmental protection and economic growth are not easily reconciled, where scientific expertise plays an important role and where international cooperation is called for. There are various forest governance initiatives with government involvement which are located at regional levels (Europe, Africa, Asia, the Americas; see Freer-Smith, 2007 for an overview). In addition, voluntary schemes based on the principles developed by the forest Stewardship Council (FSC) among others have been influential (Freer-Smith and Carnus, 2008). It has been claimed that the proportion of forest cover certified by such schemes globally is ca. 10% and has played amajor role in the recent slowing rate of forest loss between 2000 and 2005 (Freer-Smith and Carnus, 2008:261). The world's forests influence climate through physical, chemical, and biological processes. There are complex and nonlinear feedback loops that are not well understood at present. These loops can dampen or amplify anthropogenic climate change (Bonan, 2008). As the special issue of Science in June 2008 exemplifies, there are uncertainties and we see researchers championing various positions in policy relevant issues. There are some advocacy scientists but their role is less pronounced compared to climate change. There is no equivalent of Sherry Rowland or Jim Hansen. However, there are attempts to replicate some of the institutionalized assessment structure that was set up for climate change. In fact, because of the close linkage between the two cases there is an overlapping jurisdiction in that the Kyoto process partly deals with forestry. In addition, the United Nations Framework Convention on Climate Change (UNFCCC) recently launched a 2-year initiative to assess technical and scientific issues and new ‘policy approaches and positive incentives’ for Reducing Emissions from Deforestation (RED) in developing countries. (Gullison et al., 2007:985).

Dimitrov (2005) has argued that ‘despite popular support for halting deforestation and despite consensus among governments regarding the unsustainable rates of forest degradation, negotiations at a number of international for a have consistently failed to produce a binding policy agreement.’ While industrialised states tried to launch negotiations on a global forest convention they did not succeed ‘due to concerted opposition by developing countries.’ Very much like in the case of climate change there is an Intergovernmental Panel on Forests which in 2000 decided to create a non-binding United Nations Forum on Forests that does not have a mandate for policy making.

Dimitrov (2005, p. 105) argues that one reason for this lack of political progress lies in the fact that ‘there is a marked paucity of information about the non-wood benefits of forests and about the consequences of deforestation. The least reliable knowledge is on the shared, cross-border effects of deforestation. Multilateral reports explicitly acknowledge that global effects on climate change and biodiversity cannot be measured with any degree of precision.’

While there is a lot of data about the extent of deforestation and a general agreement that the main causes of forest degradation are human activities, we do not know enough about the ‘non-wood benefits of forests’ and the corresponding consequences of deforestation.

For example, the FAO points to the lack of understanding regarding the impact of deforestation on biodiversity. Likewise multilateral assessments explicitly state that ‘it is highly unlikely that it will be possible, in the near future, to make comprehensive inventories of non-wood goods and services on a global basis’ (FAO, 1995, cited in Dimitrov, 2005, p.105).

Agrawal et al. (2008:1462) point out that 'there is only partial knowledge about the relationships between the condition of forests, different forms of forest ownership, and the multiple objectives of forest governance—improvements in income, livelihoods, biodiversity, carbon sequestration, and ecosystem service provision.' However, it would be wrong to believe that more knowledge will lead to political cooperation. More knowledge always increases political options and therefore provides ammunition also to those actors that want to resist global governance (Sarewitz, 2004).

Dimitrov (2005:105) observes that 'the absence of reliable information about the trans boundary consequences of deforestation has helped shape bargaining positions of states and has affected international debates at various stages.' Many countries see forests as national goods with no or unknown impacts on the global commons. A principal negotiator for Brazil argued that 'forests are not global commons, they are national resources.' Production of more knowledge might bolster such positions as they will be able to draw on research that supports their interests.

This case is very much reminiscent of early stages of the climate change issue in that a lack of scientific understanding is used in order to prevent efforts of global governance. The difference, of course, is that in the climate change case we have a clear mandate for international action (albeit with very modest results so far). International attempts at forest governance have not developed to this stage.

Forestry does not have the element prominent in the case of ozone layer protection: there are no visible scientific advocates intervening in an influential way and one can only speculate about the effect such a presence would have made. However, civil society pressure is evident as can be seen from the voluntary schemes in operation (Cashore et al., 2006). There are, of course, reasons to be sceptical about an exclusive reliance on voluntary measures. Effective governance will be most likely if various measures and instruments combine in a self-reinforcing way or if they contain a 'strong sword' (Arnold and Whitford 2006; Potosi and Prakash, 2005, 2006). NGO pressure and consumer preferences can play an important role (Agrawal et al., 2008; Stehr, 2007).

It seems as if supporters of an international governance framework in forestry face no easy task. Both ozone depletion and climate change are seen by the UN as problems relating to a common pool resource (a 'common good') where a concerted effort by all countries is needed in order to protect it. Physical properties of the atmosphere (diffusion of gases) may have facilitated such a consensus. In forestry it is still contested if forests are a global common good. Knowledge claims can be used in order to enhance and to block political efforts at international cooperation. This should be no surprise. Many countries will continue to insist on their sovereignty to use their national resources, including forests, as they see fit. International cooperation is an intrinsically difficult process. It is unlikely that knowledge about feedback of deforestation on world climate or biodiversity is powerful enough to convince dragger countries of the virtues of international cooperation.

Likewise, it might be that other forms of political intervention can deliver. After all, governance (and be it of natural resources) is always a political project—despite the prominent role knowledge can play in these processes. But economic and political tools (trade sanctions, for example) are not very attractive as they will evoke all kinds of accusations (neo-imperialism for example). Herein lies the promising potential of knowledge for decision makers as it legitimizes political decisions in a unique way. And it is no accident that the UN process has recently tried to bolster the element of scientific expertise through the Joint Initiative on Science and Technology which is supposed to assess available scientific information and to produce reports 'on forest related issues of high concern' (Freer-Smith and Carnus, 2008:257).

However, this solution will only work if all parties to an international treaty agree on the knowledge basis and implement corresponding policies—two stark assumptions to make given the sobering lessons of climate change. Of course, apart from a top down international treaty there remains the alternative of a patchwork of various policy measures, including a strong element of voluntary action. Only the future will tell if optimism in this is justified.

References

Agrawal, A., Chhatre, A., Hardin, R., 2008. Changing governance of the world's forests. Science 320 (5882), 1460–1462.

Arnold, R., Whitford, A.B., 2006. Making environmental self-regulation mandatory. Global Environmental Politics 6 (4), 1–12.

Brooks, H., 1982. Stratospheric ozone, the scientific community and public policy. In: Frank, A., Ward, Bower/Richard B. (Eds.), Stratospheric Ozone and Man. CRC Press, Boca Raton, pp. 201–216.

Andresen, S., Agrawala, S., 2002. Leaders, pushers and laggards in the making of the climate regime. Global Environmental Change 12, 41–51.

Beck, U., 1992. Risk Society. Polity, Cambridge.

Benedick, R.E., 1991. Ozone Diplomacy, New Directions in Safeguarding the Planet. Cambridge, MA, Harvard University Press.

Betsill, M., Pielke Jr., R.,1998. Blurring the boundaries: domestic and international ozone politics and lessons for climate change. International Environmental Affairs 10, 147–172.

Bonan, G.B., 2008. Forests and climate change: forcings, feedbacks, and the climate benefits of forests. Science 320 (5882), 1444–1449.

Bush, V., 1945. Science The Endless Frontier. United States Government Printing Office, Washington.

Cashore, B., Gale, F., Meidinger, E., Newsom, D., 2006. Confronting Sustainability: Forest Certification in Developing and Transitioning Countries. Yale University, New Haven, CT.

Dimitrov, R., 2005. Precaution in global environmental politics. International Journal of Global Environmental Issues 5 (1/2), 96–113.

Elzinga, A., 1995. Shaping worldwide consensus: the orchestration of global climate change research. In: Elzinga, A., Lundström, C. (Eds.), Internationalism in Science. Taylor and Graham, London, pp. 223–255.

Freer-Smith, P.H., 2007. Environmental change and the sustainability of European forests. Journal of Sustainable Forestry 264, 165–186.

Freer-Smith, P.H., Carnus, J.M., 2008. The sustainable management and protection of forests: analysis of the current position globally. Ambio 37 (4), 254–262.

Funtowicz, S., Ravetz, J., 1993. Science for the post-normal age. Futures 25, 739–755.

Gibbons, M., et al., 1994. The new production of knowledge. The Dynamics of Science and Research in Contemporary Societies. Sage, London.

Grundmann, R., 2001. Transnational Environmental Policy. Routledge, London.

Grundmann, R., 2005. Ozone and climate: scientific consensus and leadership. Science, Technology, and Human Values 31 (1), 73–101.

Grundmann, R., 2007. Climate change and knowledge politics. Environmental Politics 16 (3), 416–434.

Gullison, R.E., et al., 2007. Tropical forests and climate policy. Science 316, 985–986 (18 May).

Haas, P.M., 2004. When does power listen to truth? A constructivist approach to the policy process. Journal of European Public Policy 11:4, 569–592.

Hannigan, J., 1995. Environmental Sociology. A Social Constructionist Perspective. Routledge, London.
Hansen, J., Michaels, P., 2000. Full transcript of inaugural AARST Science Policy Forum, New York Hilton, Friday 20 November 1998, 7–9pm. Social Epistemology 14 (2–3), 131–180.
Irwin, A., 1995. Citizen Science. Routledge, London.
Jasanoff, S., 1990. The Fifth Branch: Science Advisers as Policymakers. Cambridge, MA, Harvard University Press.
Jasanoff, S., 2004. (ed.). States of Knowledge: The Co-Production of Science and Social Order. Routledge, London.
Jasanoff, S., Wynne, B., 1998. Science and decisionmaking. Human choice and climate change. In: Rayner, S., Malone, E. (Eds.), The Societal Framework, 1. Battelle Press, Columbus OH, pp. 1–88.
Latour, B., 1993. We Have Never Been Modern. Cambridge, Harvard UP. Liberatore, A., Funtowicz, S., 2003.
Lengwiler, M., 2008. Participatory approaches in science and technology. Science, Technology & Human Values 33 (2), 186–200.
Lomborg, Bjørn, 2001. The Sceptical Environmentalist. Measuring the Real State of the World. Cambridge University Press, Cambridge.
Nowotny, H., Scott, P., Gibbons, M., 2001. Re-thinking Science. Knowledge and the Public in an Age of Uncertainty. Polity, Cambridge.
O'Donnell, T., 2000. Of loaded dice and heated arguments: putting the Hansen–Michaels global warming debate in context. Social Epistemology 14 (2–3), 109–127.
Oppenheimer, M., O'Neill, B.C.,Webster, M., Agrawala, S., 2007. The limits of consensus. Science 317, 1505–1506.
Oreskes, N., Shrader-Frechette, K., Belitz, K., 1994. Verification, validation, and confirmation of numerical models in the earth sciences. Science 263, 641–646.
Ostrom, E., 1990. Governing the Commons. Cambridge Univ. Press, New York.
Pielke Jr., R.A., 2007. The Honest Broker. Making Sense of Science in Policy and Politics. Cambridge University Press, Cambridge.
Potoski, M., Prakash, A., 2005. Covenant with weak swords: ISO 14001 and firms' environmental performance. Journal of Policy Analysis and Management 24 (4), 745–769.
Potoski, M., Prakash, A., 2006. Institutional design for EMS-based government procurement policies. Global Environmental Politics 6 (4), 13–22.
Rowland, F.S., 2001. Atmospheric changes caused by human activities: from science to regulation. Ecology Law Quarterly 27 (4), 1261–1293.
Sarewitz, D., 2004. How Science makes environmental controversies worse. Environmental Science & Policy 7, 385–403.
Sarewitz, D., Pielke Jr., R., 2000. Breaking the global-warming gridlock. The Atlantic Monthly 286 (1), 54–64 July.
Schneider, S.H., 1991. Three reports of the Intergovernmental Panel on Climate Change. Environment 33 (1), 25–30.
Siebenhüner, B., 2003. The changing role of nation states in international environmental assessments: the case of the IPCC. Global Environmental Change 13, 113–123.
Skodvin, T., 2000. Structure and Agent in the Scientific Diplomacy of Climate Change: An Empirical Case Study of Science-Policy Interaction in the Intergovernmental Panel on Climate Change. Kluwer Academic Publishers.
Stehr, N., 1994. Knowledge Societies. Sage, London.
Stehr, N., 2007. Moral Markets: How Knowledge and Affluence Change Consumerism and Products. Paradigm Publishers, Boulder, CO.

Ungar, S., 1992. The rise and (relative) decline of global warming as a social problem. The Sociological Quarterly 33, 483–501.
Van der Sluijs, J., Eijndhoven, J., Shackley, S., Wynne, B., 1998. Anchoring devices in science for policy: the case of consensus around climate sensitivity. Social Studies of Science 28 (2), 291–323.
Weingart, P., et al., 2000. Risks of communication: discourses on climate change in science, politics, and the mass media. Public Understanding of Science 9, 261–283.